

## Supplementary data:

# Distribution of genes associated with yield potential and water-saving in Chinese Zone II wheat detected by developed functional markers

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**Table 1.** Functional markers for high-yield or water-saving genes in wheat and PCR condition.

Trait	Locus	Marker	Primer sequence (5'–3')	Allele	Expected fragment size	Chromosome	$T_m$ (°C)	Cycles	Reference
Reduction in plant height	<i>Rht-B1</i>	BF-WR1	BF: GGTAGGGAGGCGAGAGGCGAG	<i>Rht-B1a</i>	237	4BS	63	38	Ellis <i>et al.</i> (2002)
		BF-MR1	WR1.2 CATCCCCATGGCCATCTCGAGCTG BF: GGTAGGGAGGCGAGAGGCGAG MR1: CATCCCCATGGCCATCTCGAGCTA	<i>Rht-B1b</i>	237		63	38	
	<i>Rht-D1</i>	DF2-WR2	DF2: GGCAAGCAAAAGCTTCGCG WR2: GGCCATCTCGAGCTGCAC	<i>Rht-D1a</i>	264	4DS	58	42	
		DF-MR2	DF: CGCGCAATTATTGGCCAGAGATAG MR2: CCCCATGGCCATCTCGAGCTGCTA	<i>Rht-D1b</i>	254		63	38	
Kernel weight	<i>TaCwi-A1</i>	CWI22	Forward: GTGATGAGTTCATGGTTAAT Reverse: AGAAGCCCAACATTAATCAAC	<i>TaCwi-A1a</i>	402	2AL	60	38	Ma <i>et al.</i> (2012)
		CWI21	Forward: GTGGTATGAGTTCATGGTTAAG Reverse: AGAAGCCCAACATTAATCAAC	<i>TaCwi-A1b</i>	404		58	38	
	<i>TaSus2-2B</i>	Sus2-SNP-185/589H2	Sus2-SNP-185: TAAGCGATGAATTATGGC	<i>Hap-H</i>	423	2BS	60	33	Jiang <i>et al.</i> (2011)
			Sus2-SNP-589H2: GGTGTCCTTGAGCTTCTGG	<i>Hap-L</i>	381		60	33	
	<i>TaGW2-6A</i>	Hap-6A-P1	Sus2-SNP-227: CTATAGTATGAGCTGGATCAATGGC						
			Sus2-SNP-589L2: GGTGTCCTTGAGCTTCTGA	<i>TaGW2-6A</i>	949	6AS	57	32	(Su <i>et al.</i> 2011)
		Hap-6A-P2	Reverse: CACCTCTCGAAAATCTTCCAATTA Forward: GAGAAAGGGCTGGTCTATGGA Reverse: GTAACGCTTGATAACATAGGTAAT	<i>TaGW2-6A</i>	418		57	32	
Abiotic stress tolerance	<i>Dreb-B1</i>	–	P18F: CCCAACCCAAGTGATAATAATCT P18R: TTGTGCTCCTCATGGGTACTT	<i>Dreb-B1</i>	717	3BL	56	35	Wei <i>et al.</i> (2009)

–, Unnamed marker.

**Table 2.** List of Chinese wheat varieties screened for *Rht-B1*, *Rht-D1*, *TaCwi-A1a*, *TaSus2-2B*, *TaGW2-6A* and *Dreb-B1*.

	Cultivar	Authorized year	Breeding institute
1	Cangmai 6005	2010 <sup>a</sup>	Cangzhou Agricultural Research Institute of Hebei
2	Shimai 15	2009 <sup>a</sup>	Shijiazhuang Agricultural Research Institute of Hebei
3	Hanmai 13	2009 <sup>a</sup>	Handan Agricultural Research Institute of Hebei
4	Xingmai 4	2007 <sup>a</sup>	Xingtai Agricultural Research Institute of Hebei
5	Shijiazhuang 8	2003 <sup>a</sup>	Shijiazhuang Agricultural Research Institute of Hebei
6	Linyuan 8	2010 <sup>b</sup>	Shanxi Academy of Agricultural Sciences
7	Linyou 7287	2009 <sup>b</sup>	Shanxi Academy of Agricultural Sciences
8	Shi 4185	1999 <sup>ac</sup>	Shijiazhuang Agricultural Research Institute of Hebei
9	Taishan 5366	d	Taian Agricultural Research Institute of Shandong
10	Cangmai 028	2006 <sup>b</sup>	Cangzhou Agricultural Research Institute of Hebei
11	Heng 136	2011 <sup>a</sup>	Hebei Academy of Agricultural Sciences
12	Shimai 22	2011 <sup>a</sup>	Shijiazhuang Agricultural Research Institute of Hebei
13	Yannong 0428	2008 <sup>b</sup>	Yantai Agricultural Research Institute of Shandong
14	Han 00-6012	d	Handan Agricultural Research Institute of Hebei
15	Xingmai 7	2007 <sup>b</sup>	Xingtai Agricultural Research Institute of Hebei
16	Jinmai 47	1998 <sup>ac</sup>	Shanxi Academy of Agricultural Sciences
17	Heng 4399	2003 <sup>b</sup>	Hebei Academy of Agricultural Sciences
18	Ji 5265	2009 <sup>a</sup>	Hebei Academy of Agricultural Sciences
19	Xingmai 6	2008 <sup>a</sup>	Xingtai Agricultural Research Institute of Hebei
20	Raomai 16	2011 <sup>a</sup>	Shanxi Academy of Agricultural Sciences
21	Shiyou 20	2011 <sup>a</sup>	Shijiazhuang Agricultural Research Institute of Hebei
22	Shimai 19	2009 <sup>a</sup>	Shijiazhuang Agricultural Research Institute of Hebei
23	Jingdong 18	2010 <sup>a</sup>	Beijing Engineering Research Center for Hybrid Wheat
24	Jinghua 9	2007 <sup>a</sup>	Beijing Engineering Research Center for Hybrid Wheat
25	Baomai 10	2010 <sup>a</sup>	Baoding Agricultural Research Institute of Hebei
26	Heng 0628	2006 <sup>b</sup>	Hebei Academy of Agricultural Sciences
27	Zhongmai 415	2010 <sup>a</sup>	Chinese Academy of Agricultural Sciences
28	Jimai 585	2011 <sup>a</sup>	Hebei Academy of Agricultural Sciences
29	Lunxuan 987	2003 <sup>a</sup>	Chinese Academy of Agricultural Sciences
30	Heng 06-6632	d	Hebei Academy of Agricultural Sciences
31	Jingdong 22	2007 <sup>a</sup>	Beijing Engineering Research Center for Hybrid Wheat
32	Jingdong 17	2007 <sup>a</sup>	Beijing Engineering Research Center for Hybrid Wheat
33	Jinhe 9123	2008 <sup>a</sup>	Hebei Academy of Agricultural Sciences
34	Henong 6049	2009 <sup>a</sup>	Agricultural University of Hebei
35	Han 00-7086	2007 <sup>a</sup>	Handan Agricultural Research Institute of Hebei
36	Shiluan 02-1	2007 <sup>a</sup>	Hebei Normal University
37	Heng 5229	2004 <sup>a</sup>	Hebei Academy of Agricultural Sciences
38	Han 4564	2006 <sup>a</sup>	Handan Agricultural Research Institute of Hebei
39	Henong 825	2009 <sup>a</sup>	Agricultural University of Hebei
40	Han 6172	2003 <sup>a</sup>	Handan Agricultural Research Institute of Hebei
41	Kenong 199	2006 <sup>a</sup>	Institute of genetics and Developmental biology, Chinese Academy of Sciences
42	Hengguan 35	2006 <sup>a</sup>	Hebei Academy of Agricultural Sciences
43	Chang 6359	2006 <sup>a</sup>	Shanxi Academy of Agricultural Sciences
44	Yunhan 22-33	2005 <sup>a</sup>	Shanxi Academy of Agricultural Sciences
45	Chang 4640	2004 <sup>a</sup>	Shanxi Academy of Agricultural Sciences
46	Chang 6878	2003 <sup>a</sup>	Shanxi Academy of Agricultural Sciences
47	Jintai 170	2003 <sup>a</sup>	Shanxi Academy of Agricultural Sciences
48	Yannong 836	2010 <sup>b</sup>	Yantai Agricultural Research Institute of Shandong
49	Wennong 14	2011 <sup>a</sup>	Wennong seed industry co., LTD, Shandong
50	Luyuan 502	2011 <sup>a</sup>	Shandong Academy of Agricultural Sciences
51	Tanmai 98	2010 <sup>a</sup>	Tancheng seed industry co., LTD, Shandong
52	Lukenmai 9	2010 <sup>a</sup>	Renhe seed industry co., LTD, Shandong
53	Liangxing 66	2008 <sup>a</sup>	Liangxing seed industry co., LTD, Shandong
54	Liangxing 99	2006 <sup>a</sup>	Liangxing Seed Research Institute of Dezhou, Shandong
55	Jimai 22	2006 <sup>a</sup>	Shandong Academy of Agricultural Sciences
56	Yannong 21	2004 <sup>a</sup>	Yantai Agricultural Research Institute of Shandong
57	Taishan 22	2004 <sup>a</sup>	Taian Agricultural Research Institute of Shandong
58	Jimai 21	2004 <sup>a</sup>	Shandong Academy of Agricultural Sciences
59	Jimai 20	2004 <sup>a</sup>	Shandong Academy of Agricultural Sciences
60	Taishan 21	2003 <sup>a</sup>	Taian Agricultural Research Institute of Shandong
61	Jimai 19	2003 <sup>a</sup>	Shandong Academy of Agricultural Sciences

**Table 2** (contd)

	Cultivar	Authorized year	Breeding institute
62	Zhongmai 175	2011 <sup>a</sup>	Chinese Academy of Agricultural Sciences
63	Zhoumai 18	2005 <sup>a</sup>	Zhoukou Agricultural Research Institute of Henan
64	Xinmai 18	2004 <sup>a</sup>	Xinxiang Agricultural Research Institute of Henan
65	Zhengmai 004	2004 <sup>a</sup>	Henan Academy of Agricultural Sciences
66	Zhoumai 16	2003 <sup>a</sup>	Zhoukou Agricultural Research Institute of Henan
67	Xinmai 11	2003 <sup>a</sup>	Xinxiang Agricultural Research Institute of Henan
68	Zhengmai 9023	2003 <sup>a</sup>	Henan Academy of Agricultural Sciences
69	Luohan 2	2003 <sup>a</sup>	Luoyang Agricultural Research Institute of Henan
70	Yumai 66	2003 <sup>a</sup>	Lankao huanong seed industry co., ltd, Henan
71	Lankaoaizao 8	2003 <sup>a</sup>	Lankao huanong seed industry co., ltd, Henan
72	Xinong 558	2011 <sup>b</sup>	Northwestern Agricultural and Forestry University in Yangling, Shaanxi
73	Xinong 538	2010 <sup>b</sup>	Northwestern Agricultural and Forestry University in Yangling, Shaanxi
74	Xinong 556	2012 <sup>b</sup>	Northwestern Agricultural and Forestry University in Yangling, Shaanxi
75	Xinong 928	2008 <sup>a</sup>	Northwestern Agricultural and Forestry University in Yangling, Shaanxi
76	Xiaoyan 22	2003 <sup>a</sup>	Northwestern Agricultural and Forestry University in Yangling, Shaanxi
77	Shunmai 1718	2011 <sup>a</sup>	Shanxi Academy of Agricultural Sciences
78	Yunhan 618	2010 <sup>a</sup>	Shanxi Academy of Agricultural Sciences
79	Tai 10604	2008 <sup>a</sup>	Shanxi Academy of Agricultural Sciences
80	Linhan 6	2006 <sup>a</sup>	Shanxi Academy of Agricultural Sciences
81	Jinmai 79	2006 <sup>a</sup>	Shanxi Academy of Agricultural Sciences
82	Chang 4738	2006 <sup>a</sup>	Shanxi Academy of Agricultural Sciences
83	Xinmai 20	2005 <sup>a</sup>	Zhengzhou New Crop Varieties Institute, Henan
84	Zhengmai 7698	2012 <sup>a</sup>	Henan Academy of Agricultural Sciences
85	Hesheng 3	–	Unknown
86	Fengdecunmai 1	2011 <sup>a</sup>	Tiancun Wheat Improvement Technology Research Institute of Henan
87	Lunxuan 988	2009 <sup>a</sup>	Chinese Academy of Agricultural Sciences
88	Zhoumai 24	2009 <sup>b</sup>	Zhoukou Agricultural Research Institute of Henan
89	Zhoumai 26	2012 <sup>a</sup>	Zhoukou Agricultural Research Institute of Henan
90	Xinmai 26	2010 <sup>a</sup>	Xinxiang Agricultural Research Institute of Henan
91	Zhoumai 27	2011 <sup>a</sup>	Zhoukou Agricultural Research Institute of Henan
92	Zhengmai 366	2005 <sup>a</sup>	Henan Academy of Agricultural Sciences
93	Lunxuan 518	2007 <sup>a</sup>	Chinese Academy of Agricultural Sciences
94	Luohan 7	2007 <sup>a</sup>	Luoyang Agricultural Research Institute of Henan
95	Luohan 11	2009 <sup>a</sup>	Luoyang Agricultural Research Institute of Henan
96	Luohan 6	2006 <sup>a</sup>	Luoyang Agricultural Research Institute of Henan
97	Zhoumai 22	2007 <sup>a</sup>	Zhoukou Agricultural Research Institute of Henan
98	Luomai 23	2009 <sup>a</sup>	Luoyang Agricultural Research Institute of Henan
99	Luohan 9	2009 <sup>a</sup>	Luoyang Agricultural Research Institute of Henan
100	Xinmai 19	2006 <sup>a</sup>	Xinxiang Agricultural Research Institute of Henan
101	Luomai 21	2009 <sup>a</sup>	Luoyang Agricultural Research Institute of Henan
102	Luohan 13	2009 <sup>a</sup>	Luoyang Agricultural Research Institute of Henan

<sup>a</sup>Wheat varieties authorized by the national evaluation committee. <sup>b</sup>Wheat varieties authorized by the provincial evaluation committee.

<sup>c</sup>Control wheat varieties; <sup>d</sup>, outstanding yield wheat varieties in the recent regional trial. –, Commonly transgenic receptor wheat in the past decade.